

15
PUBLIC HEALTH ACT

(11 & 12 Vict., Cap. 63.)

R E P O R T

TO THE

GENERAL BOARD OF HEALTH

ON A

PRELIMINARY INQUIRY

INTO THE SEWERAGE, DRAINAGE, AND SUPPLY OF
WATER, AND THE SANITARY CONDITION

OF THE INHABITANTS

Blackpool.

OF THE TOWNSHIP OF

LAYTON-WITH-WARBRICK.

By BENJAMIN HERSCHEL BABBAGE,

SUPERINTENDING INSPECTOR.



LONDON.

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FOR HER MAJESTY'S STATIONERY OFFICE,

1851.

NOTIFICATION.

THE General Board of Health hereby give notice, in terms section 9th of the Public Health Act, that on or before the 1st of February next, being a period of not less than one month from the date of the publication and deposit hereof, written statements may be forwarded to the Board with respect to any matter contained in or omitted from the accompanying Report on the Sewerage, Drainage and Supply of Water, and the Sanitary Condition of the Inhabitants of the Township of LAYTON-WITH-WARBRICK, or with respect to any amendment to be proposed therein.

By order of the Board,

HENRY AUSTIN, *Secretary.*

*Gwydyr House, Whitehall,
10th January 1851.*

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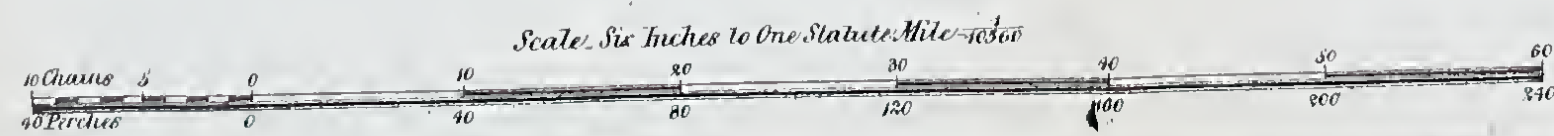
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LAYTON WITH WARBRECK.





Present Boundary marked thus -----
 Proposed Boundary Colored Red.





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PUBLIC HEALTH ACT (11 & 12 Vict., cap. 63).

Report to the General Board of Health on a Preliminary Inquiry into the Sewerage, Drainage, and Supply of Water, and the Sanitary Condition of the Inhabitants, of the Township of LAYTON-WITH-WARBRICK, in the County of Lancaster. By BENJAMIN HERSCHEL BABBAGE, Superintending Inspector.

Notting Hill, 6th August 1850.

MY LORDS AND GENTLEMEN,

IN obedience to your directions I caused notices to be inserted in the Preston papers upon the 13th July 1849, and to be posted upon the church and chapel doors of Blackpool, and upon other places within the township of Layton-with-Warbrick, where notices are usually affixed, to the effect that I intended to make a sanitary inspection of that township upon the 31st of the same month. Accordingly upon the day named in those notices, I held a public meeting at the Clifton Arms Hotel, in order to open the subject of the aforesaid inspection, and upon that and the two following days I proceeded to make a personal examination into the state of the above township. I invited such of the inhabitants as might feel disposed to do so, to accompany me in my perambulation of the township, and I have to thank several gentlemen for their assistance in pointing out the boundaries and the different localities in the township; amongst these I am especially indebted to Mr. Thornber, a gentleman whose long residence at Blackpool has given him an intimate knowledge both of that place and of the neighbouring district. Upon the 3rd of August I held a final public meeting of the inhabitants, at which I gave a general account of the state in which I had found their township.

It will be in the recollection of the Board that this inspection of Layton-with-Warbrick was ordered, in consequence of a petition signed by more than one-tenth of the rated inhabitants of that place, and dated the 10th September 1849, having been laid before the Board, praying that such an inspection might be made with a view to the application of the Public Health Act to that place.

The inhabitants of the township, but more particularly those of the favourite watering-places of Blackpool and South Shore, evinced considerable interest in the proceedings, and the attendance at the public meetings was very numerous. Amongst those who were present upon the occasion were the Rev. T. P. Creedy, incumbent of Blackpool; Mr. James Fair, agent to Mr. Clifton, the lord of the manor; Drs. Cocker and Baker, M. D.; Messrs. Kershaw

and Moore, surgeons; Mr. W. Thoruber, B.A.; Messrs. Richard Banks, Caunce, Thrallfalt, John Poole, guardian; W. Watson overseer; W. Shaw Fenton, surveyor to the Blackpool; Collins solicitor; Dickson, Sharples, Bennett, Walker, Poole, Brierley MacGowan, &c., of Blackpool; Mr. Vallett, Preston; Mr. May Macclesfield; Mr. R. Moore, solicitor, Kirkham; and Mr Cuffley, Manchester.

I now beg leave to submit to the Board the following report as the result of this inspection:—

TOPOGRAPHICAL AND GEOLOGICAL DESCRIPTION.—The township of Layton-with-Warbrick consists of a long tract of land running north and south along the coast of Lancashire, between the mouths of the rivers Wyre and Ribble. The extreme length of the township is about $3\frac{1}{3}$ miles, but its breadth does not exceed 1 mile, excepting in that portion in which Blackpool is situated where it reaches inland for nearly 2 miles. The inhabited portions of the township consist of the rising watering-place of Blackpool of which South Shore may be considered as a portion, and the two small villages of Great and Little Layton, which latter scarcely number more than two dozen cottages between them both. The great mass of the population is collected at Blackpool and it was consequently to this place that my attention was chiefly directed during my inspection.

The town of Blackpool, for the most part, covers but a narrow tract of ground. In that portion of it, however, in which the church is situated, the market and the streets in its neighbourhood increase its breadth considerably. South Shore, as its name implies, lies to the south of Blackpool, but is connected with it by a number of scattered houses facing the sea. Probably a few years will see both places joined together by a continuous line of houses. The greater part of the houses in Blackpool face the sea, and overlook the public promenade, which is carried upon the top of a low range of marly cliffs, that slope down very steeply to the sands. Nearly parallel to the promenade, and at the back of the houses facing the sea, is Bank Hey-street, whilst Talbot-road, leading to the railway station, and Church-street, at the top of which the church is built, run inland in a direction nearly at right angles to the Promenade. From these main streets several other small streets diverge, as may be seen upon the accompanying map.

South Shore, in like manner, consists chiefly of a line of houses overlooking the Promenade and the sea, together with a few back streets behind them.

A large dyke or stream, called the Blackpool, from the dark colour of its waters, separates Blackpool from South Shore, and discharges itself upon the sea-beach between these two places.

The land about these places is, geologically speaking, of very recent formation, having been a portion of the bed of the sea at

to a very distant period. The northern portion of Blackpool stands upon a thick stratum of red marl, containing recent shells, with thin beds of sand in it. Towards the southern extremity, near the Blackpool, the immediate subsoil is peat, but in approaching South Shore the peat becomes covered with a bed of blown white sand. This peat, which in some places is $2\frac{1}{2}$ yards in thickness, thins out towards the sea at South Shore to not more than 12 inches. At the latter place the overlying stratum of sand varies from 2 to $2\frac{1}{2}$ yards in thickness; below it lies the thin bed of peat above mentioned; and under this again is a layer of bluish silt, reposing upon a thick stratum of red sand; whilst below them all is found the same red shelly marl which at Blackpool comes to the surface, and there forms the sea shore.

NATURAL DRAINAGE.—The surface of the land in the township of Layton-with-Warbrick varies from about 110 feet above the mean level of the sea down to a height of a few feet only above that level. The lowest land lies along the course of the Blackpool stream, and forms a valley which runs down to the sea-shore between Blackpool and South Shore. A considerable portion of this land is very marshy, and is little better than a bog, but the owner of it, Mr. Clifton, under the skilful direction of his agent, Mr. Fair, is rapidly improving it by carrying out a system of thorough subsoil drainage upon it; thereby not only very greatly increasing the value of the land, but at the same time rendering the neighbourhood more healthy, by removing a source whence miasma was in former times generated in abundance, and producedagues and low fevers.

The marl cliffs, forming the sea-beach at Blackpool, fall gradually from the northern extremity of the town, where they are about 100 feet in height, down to a little above high-water mark at the Blackpool stream. From the square facing the Clifton Arms Hotel, the ground continues to rise slightly inland up to the railway station, which is upon the highest ground in the immediate neighbourhood of Blackpool. To the south of the Clifton Arms Hotel the ground falls slightly inland, and discharges its surface drainage into the Blackpool. South Shore is built at a considerably lower level than Blackpool, being but little more than 25 feet above the mean level of the sea. Here also the ground falls slightly inland.

The marly subsoil of the greater portion of the township being very retentive of moisture, its surface is studded with small pools and pits, which receive the land drainage, and which are much resorted to by the inhabitants for a supply of soft water.

Mr. Thorner, who has made a particular study of the neighbourhood of Blackpool, furnished me with the following account of it:—

“All the low land in the district called the Fylde, in which the

township of Layton-with-Warbrick is situated, appears to have been early times under water. The district of the Fylde is bounded up the north by the river Wyre, and upon the south by the river Ribb. In the northern part of this district is Thornton Marsh, a very deep deposit of silt and sand, in which the bones of deer are met with at great depth. The central portion of this district, in which Blackpool is situated, is formed by an extensive deposit of argillaceous shelly marl in which thin beds of sand and gravel occur occasionally. The southern portion, extending from Blackpool to the Ribble, is formed by a stratum of blown sand overlying a bed of peat. This peat, which in many places forms the surface of the ground, appears to be the remains of an ancient forest, as large trunks of oak and yew are frequently found in it. The Cistercian monks of Stanlaw, afterwards the Holy Abbey, were the first persons who attempted to drain this low land. At a late period mention is made in an old deed of about the year 1240, of a dyke having been cut from Marton Mere to Carlton, for the double purpose of draining the land and working a mill. Subsequently, less than four other cuts were made to drain the land, and mills were established upon them. This drainage of the land gradually worked a material change in the features of the country, but the significant names of Meres, Tarns, Loaches, Dubs, &c., which have survived the cause which originated them, sufficiently indicate what was the former nature of the country. In the last century an Act of Parliament was obtained to cut a dyke, called the Main Dyke, from Marton Mere to the Skelton pool, a stream running into the Wyre. Of late years Mr. Clifton, under the agency of Mr. Fair, has been draining extensively the mosses and low grounds, and has transformed them from marshy wastes into fertile fields. Owing to the efforts of the Lytham Agricultural Society, the knowledge of the benefits attending subsoil tile drainage has been extensively spread, and many of the landowners and tenants have adopted it; the plan being, that the landlord finds the materials, and the tenant does the labour."

METEOROLOGICAL OBSERVATIONS.—The Rev. S. Clay, chaplain to the House of Correction, Preston, kindly furnished me with a copy of the records of the rain-gauge kept at that place during the years 1849-50. He also gave me, for the sake of comparison, the record for the years 1848, 49, 50, of a rain-gauge kept at Howick, about three miles to the west of Preston. Preston itself is about 14 miles to the west of Blackpool.

RECORD of the RAIN-GAUGES at HOWICK and PRESTON.

	1848		1849		1850			Mean Rain-fall for each Quarter.
	Preston.	Howick.	Preston.	Howick.	Preston.	Howick.		
January . .	..	1.95	4.54	4.30	3.02	2.56	} Spring Quarter	} 7.73
February . .	..	5.77	2.00	1.95	2.99	3.06		
March . .	..	3.14	0.66	0.66	1.05	0.99		
April . .	..	1.84	1.30	1.18	3.10	2.99	} Summer Quarter	} 5.88
May . .	..	1.58	1.84	1.50	1.46	1.04		
June . .	..	4.85	1.25	1.10	2.50	1.85		
July . .	..	3.14	4.62	5.00	3.17	3.96	} Autumn Quarter	} 11.85
August . .	..	7.09	4.03	3.85	..	..		
September . .	..	1.56	3.11	3.14	..	..		
October . .	..	4.36	4.38	4.40	..	..	} Winter Quarter	} 10.53
November . .	..	2.99	4.37	4.15	..	..		
December . .	3.04	2.93	1.93	2.08	..	..		
Total . .	..	41.20	34.03	33.31	..	..	..	35.99

I was informed that the prevailing direction of the wind at Blackpool is westerly, and as the greater part of the houses face this way, they enjoy the benefit of the healthy breezes that sweep the wide Atlantic and the Irish sea. Unfortunately, as I shall have occasion to show further on, so many sewers open upon the sea beach that these winds, although generally such as I have described, yet occasionally bring back with them from the beach the foetid odour of decomposing sewage, and treacherously waft the poisonous exhalations through the open windows into the very sitting rooms and bed-rooms of the inhabitants.

GOVERNMENT AND LOCAL ACTS OF PARLIAMENT.—The affairs of the township of Layton-with-Warbrick are managed by meetings of the inhabitants in the vestry. There are no local Acts of Parliament relating to this township.

MANUFACTURES AND TRADES.—There are no manufactories of any description at Blackpool. The principal employment of the inhabitants is to let lodgings to the crowds who flock thither in search of health and sea-bathing in the summer season, and to provide for their accommodation. This concourse of visitors has led to the keeping of great numbers of horses, ponies, and donkeys for their use. The greater part of them are kept in ill-drained yards, within, or in the immediate vicinity of, the town. During the day time they are congregated together at two or three places upon the sands, and owing to there being no regulations to enforce the speedy removal of the refuse attendant upon the collection of so many animals together, a very offensive smell is generated. This is a matter which calls for the exercise of controlling powers by the Local Board of Health, to be appointed under the Public Health Act.

VITAL STATISTICS.—The number of houses and the population of the township of Layton-with-Warbrick, together with the percentage of their decennial-increase, as taken at different periods between 1801 and 1841, is given in the following table:—

Census.	Population.			Houses.				Increase per Cent. of Population above preceding Census.	Average Number of Persons living in each House.
	Males.	Females	Total.	Occupied.	Unoccupied.	Building.	Total.		
1801	..	..	473	..	..	..	..	..	..
1811	290	290	580	113	8	..	121	22.6	5.1
1821	376	373	749	130	16	2	148	29.1	5.7
1831	442	501	943	162	21	4	187	25.9	5.8
1841	878	1,090	1,968	263	37	5	305	108.7	7.6

It will be observed that the total number of inhabitants of the township, as recorded at each successive census, has been steadily increasing, and that during the ten years, 1831-41, the population was rather more than doubled; this very great increase marks the rising importance of Blackpool as a watering-place. From the fluctuating nature of the population, which is very large during the bathing season, but falls off greatly upon the approach of cold weather, it is very difficult to form any estimate of the number of inhabitants at any one time. Judging from the result of the inquiries which I made, and from the large number of persons for whom accommodation can be found in many of the houses, I should conceive that in a full season there must be between 8,000 and 10,000 persons at Blackpool and its neighbourhood, and I should imagine that this number would probably be reduced in the winter season to little more than 2,500, as it is probable that the number of inhabitants per house at that time corresponds with the usual average of other places.

The same cause which makes it so difficult to arrive at a correct conclusion with regard to the actual number of the inhabitants also takes away from the value of any reasoning which might be founded upon the registrar's returns of mortality.

The number of deaths which took place in the township during the year 1848 was 45; but one of these was accidental. The average age at death during this year was only 23, a large number of children under five years old having died during this period. In the year 1849 the number of deaths was 30, and the average age at death was 33½ years. The number of births during these two years was considerable as compared with the number of deaths. In the year 1848 there were 64 births, and in the year 1849 the number was 74.

In the absence of any statistical data from which to form an idea of the state of health of this place, I considered that its sanitary condition must be judged of by an examination of the actual state of

the different localities in it, and for this purpose I made a general house-to-house visitation, the result of which I have given below.

GENERAL STATISTICS.—The total number of houses in Blackpool and South Shore I found to be 421, whilst the total number in the whole township as entered upon the rate-book is 461; whence it may be seen that the rural population of the township is insignificant when compared with the dwellers in the town portion of it. The following table shows the number of houses of different annual rateable values :—

Number of houses under £1 annual rateable value				.	5
Do.	do.	1 and above £2	do.	.	41
Do.	do.	2	do.	3 do.	31
Do.	do.	3	do.	4 do.	41
Do.	do.	4	do.	5 do.	31
Do.	do.	5	do.	10 do.	126
Do.	do.	10	do.	15 do.	60
Do.	do.	15	do.	20 do.	52
Do.	do.	20	do.	25 do.	25
Do.	do.	25	do.	30 do.	20
Do.	do.	30	do.	35 do.	6
Do.	do.	35	do.	40 do.	4
Do.	do.	40	do.	45 do.	3
Do.	do.	45	do.	50 do.	3
Do.	do.	50	do.	100 do.	12
Above 100				do.	1
Total					461

The total annual rateable value of the township, according to the last rate in 1850, was 10,537*l.* 10*s.* 4*d.*; and the produce of the rate, which was one shilling in the pound, was 526*l.* 17*s.* 6*d.*

The following was the amount of the poor's rates :—

	£.	s.	d.
For the year 1845	319	3	5½
„ 1846	328	1	5
„ 1847	439	4	0½
„ 1848	473	14	3½
„ 1849	359	11	11½

A very small portion of these rates was caused by relief given upon account of sickness and premature mortality, as will appear from the following accounts furnished to me by Mr. Parkinson, the relieving officer :—

Relief given on account of sickness—		£.	s.	d.
During the year ending Christmas	1847	.	5	4 6
Do.	do.	1848	.	1 8 0
Do.	do.	1849	.	4 14 0
Relief given to widows—				
During the year ending Christmas	1847	.	8	16 0
Do.	do.	1848	.	20 12 0
Do.	do.	1849	.	18 5 0

Some surprize may be excited by the very small proportion of the poor's-rates which are consumed by the expenses entailed upon the township by sickness, but it must be remembered that in Layton the labouring class, from whom the band of paupers is chiefly recruited, bears but a small proportion to the other classes, owing to the flourishing condition of Blackpool; a condition which, depending for its maintenance upon the reception of lodgers, calls a much smaller amount of labour into action than either a prosperous commercial, manufacturing, or agricultural state.

The same reason will account for the fact that there is so small a comparative amount of sickness at Blackpool, notwithstanding the very numerous cases cited below of the want of sanitary arrangements, because it is amongst the small confined dwellings of the poor, of which Blackpool furnishes but few examples, that such a state of things produces the worst effects.

SANITARY CONDITION OF THE TOWN.—It has been already remarked that Blackpool differs from most other towns of its size in an almost entire absence of small cottages inhabited by the poorer classes. With the exception of perhaps a dozen of these cottages in Lower Blackpool, and one or two upon Fumbler's-hill, cottages of this description cannot be said to exist at Blackpool. The labouring classes generally live in small villages and detached cottages in the neighbourhood. Owing to this circumstance, but few of those scenes of extreme filth and wretched accommodation which mark the purlieus of most other places are to be met with, and I may characterize Blackpool as being in a particularly clean state if it is compared with its sister towns of Lancashire. This state of cleanliness will, unfortunately, when taking the whole place into consideration, be seen to be only comparative. I shall have to point out, however, a few dirty haunts and foul slaughter-yards, which would match the worst examples to be found in other places.

The state of the town generally will best be seen from the Notes of a thorough house-to-house visitation, which I made during my inspection, and from which I beg leave to submit the following extracts relating to localities where I found instances of defective drainage and sewerage.

Albert-terrace.—A row of very good houses facing the sea. At the back of these houses are open cesspits or middens, into which the soil from the necessities empties itself. The size of one of these cesspits was 5 feet by 6 feet; that of another of them was 4 feet by 6 feet. Two privies empty themselves into each cesspit, and the night-soil is covered by the ashes and other refuse from the houses. In a small yard at the back of one of these houses was a pig-sty; two bed-room windows opened in the wall above it. Again, at another of these houses three water-closets empty

hemselves into a large covered tank, 12 feet by 8 feet, which is cleaned out once a-year. I found that this practice of making the drains from the water-closets lead to covered tanks or cesspits, is a common one at Blackpool. In answer to my inquiries as to the mode in which these tanks are constructed, I was told that they are built with bricks and mortar, and that no cement is used about them; nor did it appear that the ground around them is puddled, or that any precautions are taken to make them watertight. Some of these tanks have overflow-drains leading from them into sewers, but in others there is no provision for relieving them of their liquid contents; and from what I saw, I entertain no doubt but that, in many cases, a considerable portion of their liquid contents soaks into the ground, and ultimately finds its way into the sand-beds which supply the wells with water.

I observed in the yards of these houses in Albert-terrace that the suds ran across them in open channels upon their way to the drain which receives them. A great quantity of suds was also running over the surface of the street at the back of the above-mentioned houses.

The occupier of one of them complained that a drain, which received the overflow from a water-closet, a privy, and a cesspit, ran below his house, and emptied itself upon the beach in front, immediately below the public promenade. He further stated, that the smell from this drain was very bad, and that he had lately lost one of his best lodgers in consequence of it.

At the back of some large stables near Albert-terrace, there were two stagnant pools, one containing the drainage from some pigsties, and the other night-soil from a privy. In wet weather these ponds overflow, and their contents run down an open gutter in the field, until they find their way into a drain by the road-side, which drain empties itself upon the beach.

Fumbler's-hill.—Here I met with one of the few poor cottages which exist at Blackpool. None of the windows of this cottage were made to open. There was also at this place a very foul donkey-yard, near which the drainage from three privies and a pigsty opens into a small stagnant pond. The cellar of a house in this locality is rendered unpleasant by the soakage from a neighbour's cesspit. In a small yard, 16 feet by 15 feet, at the back of another house, there are two necessaries with an open cesspit, the smell from which was very offensive. Two bedroom windows opened into this yard.

At some houses to the north of Fumbler's-hill there was a large cesspit, 10 feet square, the overflow from which ran into an open drain in a garden upon the opposite side of the road. A large cesspit belonging to the next house was covered with loose boards.

Returning towards Blackpool, I observed six necessaries, where considerable trouble had apparently been taken in order to render them inoffensive. The refuse from them was led away imme-

diately into covered drains ; but, as always must be the case when a proper water supply is not combined with drainage, an offensive smell came up from the drains.

Upon the northern side of Talbot-road open cesspits again presented themselves ; one of these, 4 feet by 6 feet, was situated at a distance of only 6 feet from the back windows of a house. The cellar of another house was damp and offensive, there being no drainage from it.

Going up this road towards the station, there is upon the left hand side of it a large stagnant ditch, presenting an evaporating surface of about 60 square yards, which receives the drainage from some cottages, together with the overflow from the cesspits at the railway station. Nearly opposite to this ditch I found the cellar of a house without any drainage from it ; there was a small well in it, which during wet weather required to be pumped dry twice in the course of the day to prevent the cellar from being flooded. There was no drainage of any kind from this house ; the suds ran into an open ditch which was stopped up at the end. The tenant informed me that he spent between 4s. and 5s. a-year in emptying the cesspit. The hotel opposite the railway is in nearly the same condition as regards the want of drainage and the damp state of the cellar, which frequently smells offensively. The overflow from the cesspit leads into the large stagnant ditch above mentioned.

The drainage from Abingdon-street, a new street only partially built upon, runs into an open ditch in a field at the back of Dr. Baker's house.

Dr. Baker, who has bought a piece of ground in the Talbot-road, and has built a house there, complained of the annoyances he had met with, and the expense to which he had been put, upon account of the want of sewerage. He furnished me with the following statement upon the subject :—

“ In November 1846, I purchased a plot of building land, which was conveyed to me with a covenant that good and efficient sewers should be made in the road fronting it. I waited some time for its accomplishment, and frequently urged the completion of these sewers ; but up to the present time they have not been made. I understand that it has been found that the execution of them, owing to its being necessary, in the absence of any public sewers, to make their outlet upon the beach, would be attended with considerable annoyance to the owners of the very valuable property which is built upon the Parade facing the sea, which consists of houses intended expressly for the reception of first-class visitors.

“ After thus waiting for two years, at a great sacrifice of time and money, I finally succeeded in leading away the surface water and the drainage from the foundations of my house, by the construction of about 200 yards of tile drains. The overflow from the cesspit could not be taken by these drains, and the only channel which I had for it was an old sewer made by the original proprietor of the ground. This sewer, being three feet above the foundations of my house, has been the source

of great inconvenience, as I have been obliged to make a temporary cesspit accommodated to this level, which must remain until the application of the Public Health Act, which we hope will remedy our grievances."

At a place called "The Raikes," upon the outskirts of Blackpool, I found some newly-built cottages, the drainage from which ran into a stagnant ditch at the back of the garden-walls. The smell from this place was very offensive, not only in these gardens but also in the road fronting which these cottages had been built. There was no supply of water at this place, and I found that the inmates were in the habit of fetching water from a stagnant pool near at hand, and boiling it in order to fit it for drinking and culinary uses. In one of these cottages there was a family of eight persons, together with a lodger, who lived and slept in two rooms.

Returning towards Blackpool, the same want of sewerage is met with at the school-house, where the overflow from one of the privies runs into a stagnant ditch, whilst that from the other, and from the kitchen sink, flows into a ditch by the side of the turn-pike road. The average number of children at this school by whom these necessities are used, is about 100.

In the fields at the upper end of Victoria-street, there is an extensive hollow, into which runs much of the drainage from the houses in that locality, where it stagnates, infecting the air with putrid odours.

Near the market there is a piece of waste land, not yet built upon, where the greater part of the refuse from the market, and from many of the houses about it, is thrown, and as the scavenger's cart is a thing unknown at Blackpool, there is a considerable accumulation of filth.

Stanley-row, consisting of five new cottages, presents an instance of the want of knowledge of proper sanitary arrangements in the designers of new buildings. There are very small back yards to these houses, in each of which there are an open cesspit and a privy. One of the cesspits which I measured, was at 6 feet 6 inches distance from a pantry window, whilst the back of the cesspit was formed by the wall of the pantry belonging to the next house. From the way in which these cottages are constructed, the back yards are mostly shut out from the advantages of ventilation. Apparently it is intended to leave a narrow passage at the back of these yards, and to build a similar row of cottages with their back yards likewise opening into this passage, in which case the evils of the present defective ventilation will be greatly aggravated.

At the top of Church-street the drainage of five houses runs into a small stagnant pond in the garden of one of them. In a yard at the back of another house was a very filthy pigsty, the drainage from which runs over the surface of the yard. In an-

14 *Sanitary Condition of the Town—Drainage and Sewerage.*

other yard there was a large refuse heap, which I found upon measuring to contain about $7\frac{3}{4}$ cube yards of filth. Further on there was another refuse heap, in which I saw the offal from a butcher's shop; this heap covered three square yards of ground. In all this part of the town open cesspits or middensteads, enclosed by low side walls, are to be found, an under-ground cesspit being the exception; and even when one is occasionally met with, it is often found to be covered by loose boards only, as was the case with one which I noticed in Green-Walk.

I observed upon the northern side of Victoria-street some good houses, from which there was no drainage, and I was informed that they were let at rents varying between 40*l.* and 50*l.* a-year. The back yards of these houses are very small and confined, from being surrounded upon three sides by buildings; and the ventilation is rendered still worse by three or four large soft-water tubs, which, in order to economize space, are fixed overhead at about 8 or 10 feet above the pavement of the yards. In consequence of the want of space in these yards, the privies are built below a first-floor bedroom in a recess leading out of the yard. Many of the bedroom windows open into these yards. The drainage from the sink-stones runs over the surface of a narrow walled passage or lane, 9 feet in width, into which the doors from the yards opened. Taking into consideration the size and rent of these houses, the arrangements of their back premises are as badly contrived as those of any houses which I met with at Blackpool.

Upon the other side of the above back lane or passage, but separated from it by a high wall, there are several large yards; in one of these I observed five large pigsties; there were also five covered under-ground cesspits, some of which appeared to be full, as the drainage was oozing out from the stones with which they were covered. In addition to these covered cesspits there was an open one 10 feet by 7 feet.

Upon the western side of Cross-street there is a large yard in a very dirty condition, with six stables in it; at the back of it is a smaller yard, covered with filth, and appropriated to the use of pigs.

Between Bank-Hey-street and South-Beach I found a small yard where the drains were stopped up, and where stagnant water was lying upon the surface of the ground. There was also a pigsty in this yard, which is in close proximity to the back of the houses in Hygcine-terrace, a favorite resort for visitors, as the houses in it face the sea.

In Bank-Hey-street there is a large horse-pond, into which runs the surface drainage from the street. Upon the eastern side of this street I found a small yard with five pigsties in it; the drainage from them runs into an open passage. There was here a refuse heap 8 feet by 6 feet, with water stagnating against the wall.

In the vicinity of the Castle Inn there is a small yard, 8 feet by

feet, with two privies in it; and in the same locality there are three others which open into an uncovered middenstead, 7 feet by 10 feet.

At a cottage upon the northern side of Church-street I found three cesspits having an overflow drain leading into a street drain; in consequence of the latter being full, the water does not run off, and the inmates complain of the unpleasant smell which arises from this cause. In three other neighbouring cottages the same complaints were made of their drains being filled up and consequently useless.

By the side of a street leading from Church-street to the Crown Inn, I found a long stagnant gutter full of drain-water. The overflow from some pigsties and privies flows into a piece of waste building land bordering upon this street.

In a back street, leading out of Market-street, I found the drains in a very bad state, and almost useless: there were here, as usual, dirty yards, pigsties, and refuse heaps.

The market houses, from whence peculiar care should be taken to remove offensive matters, I found to be particularly deficient in all the means for securing cleanliness. At the back of the fish-market, there is a small back hole, into which stinking fish and other refuse is thrown. In this place a tub of soft water is kept for washing the counters, fish, &c. When the great power with which water absorbs all putrid and offensive gases is considered, it will at once be seen that this is the very worst place in which to keep the water which has to come into contact with the fish. Near this market there is a public slaughter-house, 7 feet by 12 feet, with a yard of about half this size behind it. A very offensive middenstead, 4 feet by 12 feet, into which the greater part of the refuse from the market is thrown, *opens out of the slaughter-house*. There is a drain outside the door, from which, as usual, proceeds an offensive smell.

The arrangements for the butchers' market are much worse than those of the fish-market. At the upper end of this market there is a small passage, 10 feet in length, which leads to a privy, used in common by the whole market: there is also an open cesspit, 8 feet by 4 feet, which receives the contents of this and two other privies. At the top of this market there is a very small yard, which contains at one end the above two necessities, one used by the females in the vegetable market, who have to pass through the butchers' market in order to reach it, and the other appropriated to the use of the cottage inhabited by the clerk to the market. At the opposite extremity of this yard stands the market pump, considered to yield some of the best drinking water in Blackpool. Immediately below the pump a very offensive smell comes up through the sink-stone, which appeared to be caused by the overflow drain from the large cesspit above mentioned, which leads into the waste-water drain from the pump.

In a narrow yard, at the back of a house in Market-street opposite to the market, there is a small open cesspit, 2 feet by 4 feet, distant only 3 feet from a kitchen window. Another house near to this has the same defective arrangement.

In a large yard upon the northern side of West-street, there is an enclosed refuse heap, 16 feet long and 6 feet wide, which is used as a pig-yard. Near to this place, at the back of a cottage upon the North Beach, is a narrow yard, with an open cesspit 6 feet by 3 feet. The back kitchen of this cottage is flooded from a cesspit belonging to the privy of the next house. Another house upon the North Beach has an open sewer running through the cellar; in the back yard there is an open cesspit, 3 feet 6 inches by 4 feet. The occupier complained that he had been ill for three days, owing to the smell rising into his house from the cellar.

Four of the houses upon the southern side of West-street have their back yards *below the billiard-room* of the Golden Fleece which room is supported upon brick pillars. There are two pigsties and four privies in these yards, below the billiard-room. The contents of one of these privies soaks through the wall into a passage common to the four houses.

Returning to the North Beach, consisting, it must be remembered, of very good houses, I found in the yard of one of them an open cesspit, 4 feet by 6 feet; in another yard, three covered cesspits; and in a third yard, which was only 8 feet by 9 feet, an open cesspit about 5 feet square, in close proximity to a scullery window. The cellar of one of these houses could not be used, as the drains from it did not act.

In the back yard of an hotel, at the corner of North Beach and Lane-End-street, there are five covered cesspits sunk in the ground. In a neighbouring house I found an offensive drain immediately below the pantry window.

Upon the southern side of Lane-End-street, and behind the houses upon Hygiene-terrace, there is a large pig-yard, 40 feet long and 10 feet in width, the entry into which is so filthy that it is scarcely accessible.

In the back way to the public baths there is a large refuse heap, about 20 feet by 9 feet.

I found that to every two houses on Hygiene-terrace there was an open cesspit, measuring about three square yards.

Near the corner of Victoria-street, and Bank-Hey-street, I found a narrow yard or alley, in which there was a small dwelling-house with a stable upon one side of it and a large refuse heap under the same roof upon the other side. At the extreme end of this yard are two privies used by the occupants of seven shops in Victoria-street. One side of this yard is formed by the back wall of these shops, and the opposite side by the above-mentioned building, in which are the stable and dwelling-house. The width of

is yard is 7 feet. The smell from the refuse heap was very offensive. At the entrance of the yard is a cellar bakehouse, with an inefficient drain. The occupier of the bakehouse described the stowage as "boiling up" from this drain, and complained of its offensive state. To complete the description of this yard, it must be stated that there is an open drain running down the whole length of it, which is below the level of the foundations of the wall of the dwelling-house.

Proceeding down Bank-Hey-street, I observed several open cesspits of between two and three square yards of extent each. The back yard of a shop in this street consisted of a short passage, 2 feet 11 inches wide, with a privy and an open cesspit below a bed-room, in a recess opening out of the passage. I observed a similar defective arrangement in one of the houses in Queen's-terrace. At another house in this terrace, I found a pigsty built against the wall of a neighbour's pantry. Complaints were made of the smell arising from this pigsty.

At Hounds-hill I found two underground cesspits full of filth; one of them was covered by some loose boards. There was also a very dirty pigsty, of which the neighbours complained, and on the other side of the road, a cow and pig yard in a similar state. One of the cottages in this place consisted of two rooms and a back kitchen, sunk one step below the road, and not drained. A woman died of English cholera last year in this house. In another cottage, I observed that the pantry was next to the privy; the occupier complained of the offensive state of the pantry, in consequence of the proximity of the privy. At the bottom of Hounds-hill there is a slaughter-house, from which a bad smell proceeded. In front of this slaughter-house there is a pig yard, and at the back of it four pigsties and a paddock, where there is usually a stagnant pool of sewage. Some open gutters had recently been cut in the grass to draw off the sewage.

A private sewer has been made down Bank-Hey-street, which receives much of the sewage of Victoria-street, and the other streets running into it. At the foot of Hounds-hill this sewer empties itself into an open ditch, which runs across the meadows, crossing in its course near several cottages, to the stream called the Blackpool, into which it finally empties itself; the united waters of the brook and the sewer, after a short course, flow over the sands to the sea, poisoning the air around.

The sewage from the New Inn runs into an open ditch in the meadow behind it; the privies belonging to the inn, together with those of the other houses to the south of the inn, empty themselves into this ditch, which skirts their back premises. At the back of these houses I observed large open middensteads, pigsties and dirty back passages, with defective ventilation. I counted 12 windows which opened into one of these passages, and found that most of them belonged to bed-rooms.

The small houses in Brunswick-street were in the same defective state as the larger ones above described, and the premises here also empty themselves into an open ditch.

Nelson's-row consists of some small cottages close to the dyke in the meadows, which receives so much of the sewage of Blackpool. The only thing for which they are remarkable is a pump reputed to yield the best drinking water in this part of the town.

There are some cottages in Chapel-street, where I observed a middenstead and a privy in a recess below a bed-room. In a recess at the back of these cottages was a small pool with stag drainage in it; and there was a similar offensive pond in the street. Near another cottage a very filthy pigsty drains into the pavement.

The houses facing the sea upon the south side of the Victoria Hotel, have large open cesspits, varying from 4 feet to 5 feet 6 inches square; some of them have pigsties in the back yard. Many of them are built upon the same defective plan which I have elsewhere pointed out, having two wings jutting out beyond the main front, leaving a narrow court between them. One of these courts which I measured was 30 feet in length and 7 feet in width; nine windows opened into it. Some of these houses have no drains at all, and two of them have drains leading into a ditch in the street at the back of the houses.

Chapel-street is very badly drained, and complaints were made that the road was flooded in wet weather. The drainage from some pigsties and privies, runs out upon the open beach at the end of this street.

Lower Blackpool consists chiefly of some old fishermen's cottages, some of which, it was stated, were about to be pulled down. These houses generally were in a bad state, in some of them the windows would not open; others had pigsties which drained into the beach; another had no necessary belonging to it. I saw large refuse heaps unacquainted with the scavenger, and privies without either cesspit or drain to them. Lodgers are taken in at many of these cottages. As far as I saw, the sleeping-rooms were very clean and decent, but the beds were very much crowded together, and the space allowed for ventilation was utterly insufficient.

It was stated to me that, nine years ago, small-pox made great ravages in this locality, and that there were cases of it in several families at the same time.

Near the Yorkshire-House Hotel I saw a large yard with pigsties and uncovered drains in it; there was also a middenstead into which the refuse of fish was thrown.

Next to the Fox Hall Inn there is a narrow back yard, which I found in an extremely offensive state. A pig was kept in it, and a strong smell of stinking fish arose from it. The cellar of

house to which it belonged, was stated to be quite filled up by the overflow from the drains.

Between Fox Hall and the Manchester Hotel, the Blackpool runs down to the sea, and escapes through a double set of self-acting trap-doors on to the beach, across which it meanders towards the sea. It has already been mentioned that the sewage of a considerable portion of Blackpool runs down a covered drain laid Bank-Hey-street, whence it flows in open ditches across the meadows into the Blackpool. This sewage makes the waters of the stream sometimes very offensive, and many complaints were made, both by residents and by visitors, of the nuisance created upon the beach, by these drainage waters being suffered to spread themselves in large stagnant shallow pools upon the sands. Occasionally the sea chokes up the outlet of the Blackpool with sand, and the person who has the charge of superintending this stream is then obliged to remove the sand, and open the traps, in order to allow the accumulated back waters to run off. He stated that upon these occasions the smell from the water is very offensive.

Between the Manchester Hotel and the main part of South Shore there are several isolated houses facing the sea: almost all the drains from these houses open upon the sea-beach in front of them.

On approaching South Shore, the first houses met with are called Victoria-terrace. I found there large open cesspits, about 10 feet square, into which the privies empty themselves. The drains from the water-closets lead into covered tanks, from whence overflow drains convey the surplus water into the above-mentioned open cesspits. I observed that the open cesspit of a small house at the back of this terrace was placed at the short distance of five feet from a kitchen window, and that the privy itself was close to the window.

In Bolton-street I observed a cesspit and two privies below a building in a narrow alley, at a distance of 6 feet 6 inches from a kitchen window.

A drain from Union-street, running through the back yard of a house that belongs to Mr. Swindell, passes below the house, and empties itself upon the beach. This drain is very small and badly constructed, and is consequently unable to carry off the drainage waters running into it, which, in wet weather, flood the parts adjacent. The overflow from several pigsties and privies has been surreptitiously carried into this drain. Mr. Swindell complained, that his house was rendered very offensive by the smell coming from it. He stated that a gentleman had taken his house the preceding season, but would not remain in it, on account of the bad smell, and that he had lost 24 guineas in consequence.

In a yard next to Moore's baths, I found a cesspit 6 feet by 6 feet immediately below the window of a back kitchen.

On the western side of Union-street there is a large pig-yard into which is turned the overflow from the salt-water baths, where it is left to soak into the ground, or to escape as best it can.

Near this place are some small houses in an alley, in the back kitchen of one of which I found a privy built. The liquid contents of the cesspit of another of these houses soak through the wall into the neighbouring house. Two of these houses have back yards, and the refuse from them is thrown over the wall into a neighbour's yard.

In a yard at the back of one of the houses in South Parade there is a covered tank about one yard square, and a yard and a-half, or two yards deep, which receives all the drainage from the water-closet, privy, and kitchen of a house containing, in the summer season, about 12 inmates. This covered tank is at two yards distance from a well in the yard of Mr. Swindell's house, which is reputed to contain very good water, and to which many of the neighbours resort for drinking water. The drain, of which mention has been made above, runs within *half a yard* of this well. By referring to the description of the subsoil of South Shore, it may be seen to consist of a white-blown sand, from two to three yards deep, below which there is a bed of peat. The wells in South Shore are usually about two and a-half yards deep, which is less than the depth of the well in question. In answer to my inquiries, Mr. Swindell informed me that no particular pains were taken in the construction, either of the covered tanks or cesspits, or in the laying of the drains, and that no cement was used about them. There is then here a tank, manifestly too small to contain all the drainage which would naturally come from a house capable of accommodating 12 persons, together with a drain unable to carry away the waste water which it receives, situated in a bed of sand at a short distance from a shallow well. A little consideration of these things will at once account for the fact, which was stated as being a remarkable privilege of this well, viz., that however much water was pumped from it, the well was never dry; and this is to be wondered at, since a very small additional quantity of water percolating through the sand would suffice to keep up the supply which under such circumstances must be constantly recruited. The waste water filtering back again to the well through the sand.

In a very small yard belonging to the baths there is an open cesspit 4 ft. by 3 ft. 6 in. A drain has been made by two of the house-owners, at an expense of 3*l.* each, in the street by the side of the baths, which drain carries off the waste water from the baths, and the drainage from a house above the baths, and discharges them upon the sea-beach.

In a yard at the back of Adelphi Cottage there is a slaughter-house, with a yard attached to it, which is in a truly disgusting state. The blood from the slaughter-house runs down an open

ter in the yard to a smaller yard at the bottom of the first, where it collects in stagnant pools. This yard was in a very filthy state, offal and refuse of all kinds lying about it, and a large dung-heap being situated at the end. In another large yard at the back of the slaughter-house, there was an extensive open cesspit 15 feet by 6 feet, which I found half full of green stagnant water and decomposing animal matter.

At the back of the Post-office there was a yard with a small pool of stagnant water and some very dirty pigsties.

Amongst the new buildings at the southern end of South Shore, I observed many open cesspits, varying from 4 to 6 feet square. I noticed one cottage particularly, where there was a very small yard about 10 feet by 7 feet, surrounded upon three sides by buildings. There were a privy and an open cesspit in this yard, whilst a kitchen, a back kitchen, and a bed-room window opened into it. The cesspit and privy, as usual, smelt offensively. In another new house near the church I found a kitchen window close to the door of a privy, and an open cesspit at 4 feet 6 inches from this window.

After examining carefully into the state of the town of Blackpool, I proceeded to make an inspection of the village of Great Ayton, which consists of a few small cottages. I found many dung-heaps by the side of the road against the cottage walls, and the whole place in great need of drainage. It was stated that typhus fever had committed great ravages in this little village many years ago, there having been 11 deaths out of 25 attacks; and when I saw the dirty condition of the village even now, I was very surprised that outbreaks of typhus had not been more frequent there.

From the details which I have given above of the state of Blackpool and South Shore with regard to the existing drainage, showing the entire want of drainage in some parts and the very deficient amount of it in others, the emptying of the drains into open ditches tainting with their poisonous gases every breath of air which sweeps their fetid surface, the size and number of the open cesspits and their frequently unsuitable position below kitchen and bed-room windows, the want of judgment displayed in the sanitary arrangements of many of the new buildings, and the defective accommodation in many of the older structures, the Board will perceive that nothing short of such a change as is contemplated by the Public Health Act will be adequate to meet the necessities of Blackpool and its neighbourhood.

In order to arrive at a fair conclusion regarding the general amount of accommodation in Blackpool and South Shore afforded by the construction of necessaries and waterclosets, I sent a careful person to obtain the number of them as compared with the number of houses. I also directed him to take account of the number of

pigsties actually tenanted by pigs, which struck me as being very large. The following is the result of his inquiries :—

In Blackpool and South Shore there were 421 houses.			
Ditto	ditto	ditto	352 privies.
Ditto	ditto	ditto	112 waterclosets.
Ditto	ditto	ditto	181 pigsties.

As in all cases where a house is provided with a watercloset there is also a privy belonging to it for the use of the domestic, it would appear that 69 houses must be without privies; the inmates of them probably have the use of one in common with a neighbour. The number of pigsties, being about 1 to every $2\frac{1}{2}$ houses, is very large; and as the majority are in close proximity to dwellings, in a dirty state, and without drainage, they cannot be very prejudicial to the health of the inhabitants, whilst the smell from them must be equally disgusting to the visitors who resort to Blackpool for the benefit of the sea-air, hoping to be left behind them in the manufacturing and commercial towns all agreeable and unhealthy odours.

Dr. Cocker furnished me with the following interesting statement respecting the form which disease has assumed at Blackpool during the last 20 years, which shows that as one disease dies out or expends its virulence, another steps in to occupy its place. It is also interesting, as furnishing additional testimony to the general sanitary benefit which is derived from well draining the land in the vicinity of inhabited places:—

“ From 1830 to 1835 intermittent fevers were very numerous in consequence of stagnant, peaty, and decomposing vegetable matter being allowed to stand in open watercourses in and about Blackpool, giving out putrid malaria, which infected the atmosphere and thereby produced disease.

“ From 1835 to 1840 intermittent fevers became scarce, the prevailing diseases during this period being inflammatory fever, inflammation of the lungs, pleurisy, &c., arising generally from plethora. The reason of the diminution of intermittent fevers was the general draining of the land in the neighbourhood, which was effected during the period in question.

“ From 1840 to 1850 the prevailing diseases appear to have changed their character, the common inflammatory fever having given place to the continued and typhoid form, and simple bowel complaint having changed to diarrhoea and malignant cholera. I have noticed, and I can safely say, that diseases, particularly febrile diseases, are *now* more virulent and fatal than formerly, which I have no doubt arises from the greater accumulation of decomposing animal and vegetable matter caused by the rapid increase of population, which refuse is suffered to lie in open drains and ditches, charging the air with destructive gases, giving rise to diseases of the worst character.”

There is one point to which I have occasionally alluded in the above description of Blackpool and South Shore, to which I should wish particularly to direct attention, and that is the number

Drains and sewers which open upon the beach, for the most part se to the public promenade, whence their foul waters trickle or the sands to the sea, or stagnate upon them in shallow pools, disgusting the frequenters of this the favourite ride and walk of town.

I may here mention what I saw the first evening of my arrival, a sample of the results to which this abominable disposal of sewage leads. I was walking upon the sands, and observed considerable sewer discharging a small stream of water, which ve out a very offensive odour. The tide being low, this water d run into a large shallow pool left by the retiring waves, and e whole surface, consisting of mingled salt and fresh water, urther with the sewage from privies and waterclosets, sweltering neath a July sun, gave off odours which were anything but reeable to one whose sense of smell had not been deadened by residence at Blackpool.

I carefully examined the outlets of all the sewers opening upon a sea-beach, and made a note of their respective situations. I have given the result of my examination in the list below; but others may probably have escaped my notice from being buried in the sand. I have pointed out the places and houses to which their outlets are opposite in order to identify them, without wishing it to be understood that they convey the sewage from the houses mentioned: some of them do so; but others, like the one opposite to Mr. Swindell's house, bring the sewage from places further back. I should also mention that a few of them bring land-drainage only from the cellars without the admixture of any sewage.

LIST OF SEWERS AND DRAINS opening upon the Beach in BLACKPOOL.

- | | |
|--------|------------------------------------|
| No. 1. | Opposite Yorkshire House. |
| 2. | „ northern end of ditto. |
| 3. | „ Wylie's Cottages. |
| 4. | „ ditto. |
| 5. | „ ditto. |
| 6. | „ Chapel-street (8 inches square). |
| 7. | „ Buckingham-terrace. |
| 8. | „ ditto. |
| 9. | „ Buckingham House. |
| 10. | „ Victoria Hotel (doubtful). |
| 11. | „ ground not yet built upon. |
| 12. | „ ditto. |
| 13. | „ Revelsdale Cottage, South-beach. |
| 14. | „ New Inn. |
| 15. | „ Queen's-terrace. |
| 16. | „ Royal Hotel. |
| 17. | „ West Hey. |
| 18. | „ Beach Hotel. |
| 19. | „ Public Baths. |
| 20. | „ Lanc-End-street. |
| 21. | „ Herald Office. |

- No. 22. Opposite large Lincndraper's shop.
 23. „ West-street.
 24. „ Clifton Arms Hotel.
 25. Near to ditto.
 26. Opposite Station-street.
 27. „ Dickson's Hotel.
 28. „ Dickson's Slade.
 29. „ Fumblers'-hill.
 30. „ Royal Edward Hotel.

LIST OF SEWERS AND DRAINS opening upon the Beach at
SOUTH SHORE.

- No. 1. Opposite Warbrick House.
 2. „ Bindloss House.
 3. „ Bailey's house.
 4. „ Victoria-terrace.
 5. „ ditto.
 6. „ ditto.
 7. „ ditto.
 8. „ ditto.
 9. „ Britannia Hotel.
 10. „ ditto.
 11. „ Swindell's house (see page 19).
 12. „ Public Baths.
 13. „ Church-street.
 14. „ ditto.
 15. „ ditto.

Upon the subject of these drains, Dr. Baker made the following statement:—

“ One of the greatest grievances we have, arises from there being no other outlet than the sea, and to let any nuisance pass off in this direction is productive of a most pestiferous smell, produced by the effect of the sun acting upon the sloping beach, which its rays never get until it sinks below the horizon. Notwithstanding this evil, some persons are obliged to have recourse to this means of carrying off from the houses all offensive fluids, which is done by means of wooden spoons sunk in the bank. In the winter months it frequently happens that the heavy sea caused by a south-west gale, washes out the boulder stones forming the face of the embankment, and injures the drains; and if they be not well repaired afterwards, the stench in the summer months becomes abominable: this was particularly the case three years since. Some parties have been at considerable expense, and have used much contrivance to bottle up the precious fluid, and to let it off as the occasion may require. I cannot conceive a place that requires an effective sewerage more than Blackpool does, and I believe that it can be easily effected by a main sewer running from north to south, into which every house might have complete drainage.”

Mr. Kershaw, the surgeon, stated, upon the same subject—

“ The great want of proper drains or sewers has now become so apparent from the stagnant water lodged in various places, which are numerous that when south or east winds prevail the effluvium is p

ceptible over the whole place, and is in some localities scarcely to be endured; the only wonder is, that diseases such as fever, cholera, &c., do not make fearful ravages here. One outbreak of disease might create a prejudice against the place that years could not obliterate. I consider that the prevalence of west winds, with which this coast is especially favoured, has been the great preventive to the *awful* danger existing. The emptying of privies and ash-pits during the day-time is also a great nuisance to visitors, and the providing of such places for the cottages is a great desideratum."

He also stated :—

"At present, owing to the want of these drains and sewers, there are quantities of excrementitious matter lodged in various places, the effluvia from which is very obnoxious and detrimental to the health. It is very desirable that every nuisance of the kind should be completely removed."

EXISTING SUPPLY OF WATER.—Whilst I found the want of sewerage at Blackpool generally admitted, (the only difference being that some persons considered that the formation of one main sewer would supply all that was requisite for an efficient sewerage, whilst others considered that an entirely new system of main, branch, and house sewers was required), I found a very great diversity of opinion to prevail regarding the water supply, and that much discussion had taken place upon the subject. Under these circumstances, I made numerous inquiries into the supply of water, during my house-to-house visitation, and found that, although many individuals had at considerable expense obtained for their own premises a supply of water more or less abundant, the majority of houses had not such a supply as could be pronounced to be a proper one, regard being had to acknowledged sanitary requirements.

There are altogether 421 houses in Blackpool and South Shore, whilst the number of pumps is only 173, being about one pump to every three houses: it would, therefore, appear that, as far as regards the convenience of having spring-water near at hand, the supply is deficient. Many of these pumps do not yield water fit for anything else except "washing up," and others of them are applied to pump up the water from underground soft-water cisterns, so that the actual number of pumps affording good spring-water would, upon investigation, turn out to be very small. Two pumps were pointed out to me especially, as being resorted to extensively for drinking water: one of these is the market pump, and the other is a pump belonging to a cottage in Nelson's-row, occupied by Mrs. Lund.

The locality of the market pump has been described at page 15, where it will be seen that this pump is in the vicinity of three much frequented privies and an open cesspit, and that a drain connected with the overflow from this cesspit passes immediately below the pump, and gives off an offensive smell. The clerk of

the market informed me that there were 30 tenants who send to the market pump for water, and that they pay sums varying from 3s. 6d. to 5s. 6d. a-year for this privilege, whilst two hotel-keepers pay 10s. a-year each. He further stated that the average quantity of water taken daily from this pump is 350 gallons. *The well has been dry four times during the present year.* I found the water from this well to be very hard, exceeding 16 degrees of hardness. Its chief mineral contents were a large quantity of lime, soda probably in the form of muriate, and magnesia.

The pump in *Nelson's-row* is very much resorted to by the inhabitants of the lower part of Blackpool. Mrs. Lund said that as many as 60 families sent to this pump for water, many of whom pay her a yearly rent of 2s. 6d. for the privilege of drawing it. Her rent has lately been increased 2l. in consideration of the profit she obtains from her water tenants. Much cannot be said in favour of the particular locality of this pump, as there is a large open ditch full of stagnant sewage water immediately opposite to Mrs. Lund's house.

I shall now proceed to treat the water question in the same way as I have the question of sewerage, by laying before the Board extracts from my notes upon the subject.

Albert-terrace.—One of the houses in this terrace had no spring water; the water in the well of another house in it was turbid, and not fit to use for culinary purposes.

Cottages at the Raihes.—No supply of water; water from a pool is boiled for drinking and culinary purposes.

House in *Talbot-road* makes up 19 beds. The rain-water butts hold about 530 gallons. There is a well from 7 to 10 yards deep, but the water is not considered good. The inmates send to the market pump for drinking water, and pay 5s. 6d. a-year rent for so doing.

House in *Church-street*, occupied by a laundress, who goes to much expense in getting soft water; it costs from 6d. to 1s. per week. There is no spring water.

Post-office Hotel.—The soft-water tanks and cisterns hold upwards of 5,000 gallons. The landlord stated that he had expended more than 100l. in supplying with water the hotel, and two or three houses in its vicinity.

The Rev. W. T. Preedy stated that it had cost him 60l. to sink a well and put up a pump for supplying his house with spring water.

In *Cross-street* I observed two pumps, of which the handles were secured by chains and padlocks. They both led into soft-water cisterns.

The *Castle Inn* has no spring water. The landlord pays 10s. a-year for liberty to fetch it from the market pump. The distance is about 150 yards.

A house next to the *Castle Inn* is dependent upon rain for a

supply of water. There is a well about 9 yards deep; but it is dry in dry weather. Paid 6*d.* a-day for water during the week preceding my visit.

Upon the northern side of *Church-street* I observed several pumps locked up by chains and padlocks. One of the inhabitants complained of being robbed of water, and stated that his well had been pumped dry during the preceding night.

At another house in *Church-street* the supply of rain water collected in the soft-water cistern, had been deficient this summer, and the inmates had been dependent upon their neighbours for water.

Near *Market-street* I again observed pumps locked up to prevent the water from being stolen.

As I was informed that the inhabitants of several houses in this part of Blackpool procured soft water from a pit in a field belonging to Mr. Banks, and that some of them boiled and filtered this water for cooking, I went to this pit, and found it to be a stagnant pool fed by surface water, with a fair share of frogs and such like animals, whilst it teemed with insect life. I also saw two dead dogs floating in it.

At a large lodging-house opposite the Clifton Arms, capable of accommodating 40 people when full, I was informed that their soft-water tanks did not supply them with a sufficient quantity of water; that on washing-days they use three tubs of water, which cost 3*s.*; and that on an average of three months in the summer the expense of procuring water amounts to 6*d.* a-day.

At a house on the North Beach, where the soft-water cistern is very small, I was informed that for the first two months of this season the occupier had paid 1*s.* a week for soft water, and that he pays also 5*s.* 6*d.* a-year for spring water from the market pump.

The tenant of another house in this locality complained that he could not get spring water at all.

At the *Beach Hotel*, which accommodates about 80 people in good seasons, I found the contents of the soft-water tanks to be about 3,300 gallons. The landlord informed me that he had sunk a well and put up a pump at an expense of about 30*l.*; that before doing this he frequently had to pay in dry weather as much as 5*s.* a-day for hauling water for the use of his hotel.

Hounds-hill Cottages.—Very deficient in supply of water.

House in *Brunswick-street*.—Complaints were made of the want of water. The water from the well was declared to be unfit to drink. The pump was out of order.

At another house in this street the water from the pump is very yellow; it is filtered before being used, which improves it, but even then it is not good. I observed some stagnant water standing close to the pump.

Brunswick House.—The water from the pump is very hard,

and only used for washing dishes, floors, &c. Send to Mrs. Lund's pump for drinking water.

House on the northern side of the Victoria Hotel. The well 8 yards deep; it was deepened 2 yards this summer. The water is very hard, and occasionally tastes offensively.

Buckingham-terrace.—The pump-water is only middling, being slightly discoloured by peaty matter; but as the well has lately been sunk, the water improves by pumping.

Chapel-row.—Fetch water from above pump.

Lower Blackpool, Wylie's houses.—Get drinking water from Mrs. Lund's pump.

The *Yorkshire House*, a large hotel, has no drinking water. A well was sunk, but no water fit to use was met with.

Parr's buildings.—Mrs. Parr pays a neighbour 2s. 6d. a-year for liberty to fetch drinking water from his pump. For about three months in the year uses two tubs of water in three days. The water is fetched by her own family; but it would cost, if she were obliged to pay other people for hauling it, about 8d. a-day.

Fox Hall.—The inhabitants of the houses about here fetch soft water in cans from Rushy Hey Pit, a distance of about half a mile.

Fox Hall Inn.—The landlord said that he is very badly off for water; that he filters rain water for drinking; that he gets water for washing from the pits, where he has to pay 4d. per tub for the damage done to the grass by hauling across it; and that a tub of water costs him at the very least 1s. for carriage. His rain-water supply is contained in three tubs, holding about 660 gallons.

Manchester Hotel.—Use water in well for cooking; but send to Mrs. Lund's pump for water for drinking and for mixing with spirits.

South Shore.—Upon inquiring at the houses in Victoria-terrace, I found that at one of them the water from the pump was used for drinking; this water was rather discoloured. At another house in this terrace I was informed that the milkwoman brought drinking water from Marton at the same time as the milk. At a third house in this neighbourhood the water used for drinking was brought from a distance of three miles, where a sister of the woman of the house resided, who sent water at the same time as vegetables, &c., to her sister.

Potten-street.—I found some of the houses not provided with water; they procure it from Mr. Swindell's pump, of which I have spoken at page 20. This pump has been in use for 15 years. I found that this water was rather discoloured, and that it was very hard, 32 measures of soap test being insufficient to form a lather; this indicates that it exceeds 16° of hardness. I found the chief contents of it to be lime, soda, and magnesia; there appeared to be likewise a slight trace of organic matter.

At a house in *Union-street*, where I inquired about the water

supply, I was informed that the inmates drank rain water, not having any supply of spring water.

I found most of the new houses at the southern end of South Shore destitute of pumps, and some of them had not even a tub to hold a little soft water, so that they were, in fact, without a supply of water of any kind.

The best water to be got in South Shore appears to be that obtained from the pump at the "Doctor's Cottages." I was informed by the occupier of one of these cottages that when this water is left to stand, a reddish sediment is deposited from it.

The wells in South Shore vary from 2 to $2\frac{1}{2}$ yards in depth, and are sunk through a stratum of sand; below this sand there is a thin bed of peat, which discolours the water. I have already, when speaking of Swindell's pump, pointed out that there is every probability that much of the drainage water of South Shore finds its way into the bed of sand from whence the pumps derive their supply; and I entertain not the least doubt that a more careful investigation than it was in my power to make, owing to the short time which I could devote to this subject, would furnish ample proof of the general contamination of the well water of South Shore by admixture with the sewage from the houses.

I conceive that the facts which I have now laid before the Board relating to the supply of water to Blackpool and South Shore are sufficient to justify me in asserting that the present water supply in these places is utterly inadequate to meet the wants of the population,—that it is generally deficient in quantity, and that it is very inferior in quality.

COST OF THE EXISTING WATER SUPPLY.—Before proceeding to Blackpool for the purpose of making the inspection into its sanitary condition, a paper, by John Paton, Esq., civil engineer, which appeared in the "Preston Chronicle" of the 25th August 1849, was put into my hands. This paper is entitled "Suggestions for the Improvement of Blackpool, more especially with reference to the Supply of Water to the Town from Marton Mere." Although I do not agree with the conclusion to which Mr. Paton arrived, that the Marton Mere is the best source whence to obtain a supply of water for Blackpool, I found in this document many useful suggestions. Amongst other matters Mr. Paton made the following estimate of the original outlay in obtaining, and the annual cost of maintaining, the present inadequate water supply by means of pumps and wells:—

No.	Description.	Original Outlay.	Annual Cost.
130	Pumps and wells, at 20 <i>l.</i> each (average) . . .	£ 2,600	£. s. d
..	Annual repairs of ditto, at 8 <i>s.</i> each . . .	..	..
200	Cisterns and tanks, including pipes from roof and other matters, at 1 <i>l.</i> 5 <i>s.</i> each . . .	250	52 0 0
..	Annual repairs of ditto, at 6 <i>s.</i> each . . .	..	..
..	Loss in sinking wells, boring, and finding no water; in addition to which add, for various contingencies, 10 per cent., which includes cost of fetching water and other details, wear and tear of utensils, &c.	..	60 0 0
			285 0 0
	Interest on outlay, at 5 per cent. . . .	..	397 0 0
			142 10 0
	Total	£ 2,850	539 10 0

I made many inquiries in order to enable me to judge whether the above estimate was below or above the actual cost, and have no hesitation in saying that Mr. Paton, in his anxiety not to overstate his case, has fallen very considerably below the mark. The result of my inquiries with regard to the average expense at Blackpool of sinking a well and putting up a pump, leads me to believe that the sum at which Mr. Paton has estimated it would be very near the truth; but the annual expense of repairs would from what I have found at other places, be nearly double that at which it has been calculated. It has already been seen that the actual number of pumps is 173; so that I should be inclined to consider that the first outlay upon them ought to be calculated at about 3,460*l.*, whilst the annual expense of repairs would be about 130*l.* The expense of erecting soft-water cisterns and tanks is much more difficult to estimate, because they vary much in their dimensions and shapes. I am convinced that the expense of providing them for the hotels alone would be found to have been very considerably greater than the total sum assigned for them by Mr. Paton. In evidence of this I may mention that Mr. Dickson stated he had expended at least 400*l.* in making sewers and providing a water supply for his large hotel, whilst the expenditure at the Post-office Hotel for water alone was, as has been already stated, more than 100*l.* The soft-water tanks at the Clifton Arms are upon a very large scale; and the Beach Hotel and many of the other hotels are equally well provided.

Upon a consideration of the whole subject I should be inclined to estimate the actual outlay in providing the present supply at about 4,500*l.*, and the annual expenditure in maintenance and repairs at about 650*l.*, which latter sum would represent a capital of about 13,000*l.*; so that the total capital employed in procuring and maintaining the present water supply would be about 17,500*l.*, or rather more than 41*l.* per house.

Supposing for a moment that the present mode of supply was to be persisted in, and that wells and pumps were to be sunk, and soft-water cisterns put up, for the new buildings which will probably be erected during the next 10 years, it is only reasonable to suppose that the average capital embarked in them would be at least as great as that employed in supplying the old houses; upon which supposition the average outlay for each of the new houses would be about 41*l*.

It will be seen at page 8 that the total number of houses in the township in the year 1841 was 305, whilst the number at present is 461, being an increase of 51 per cent. Assuming that the increase of houses in the next 10 years would be at the same rate, 235 additional houses would be built during that period, and the capital to be employed in procuring for them even such an imperfect and inadequate supply as the existing houses possess, would exceed 9,000*l*., a sum which would amply cover all the expense of erecting and maintaining water-works, and of introducing into each house an abundant supply of pure soft water.

HIGHWAYS.—The roads and streets are kept in repair by road surveyors, elected annually from amongst the ratepayers. The main promenade upon the edge of the cliffs facing the sea is, of course, kept in good order as far as it extends before the handsome terraces of Blackpool and South Shore, and there is a well-paved footpath upon the side next to the houses, whilst the other side is bounded by a broad gravel-walk. This promenade at Lower Blackpool, and in the thinly-inhabited district between Blackpool and South Shore, degenerates to a road covered with coarse gravel and shingle, which is very dusty and fatiguing to walk upon. Portions of Church-street, Victoria-street, and Bank Hey-street have footpaths upon both sides of them; but generally the inferior streets in Blackpool are unprovided with this convenience for pedestrians. The great drawback to the roads and many of the streets of Blackpool and South Shore is the want of proper drainage. In the very centre of Blackpool there is a large stagnant horse-pond; in the Talbot-road, between Blackpool and the railway station, which is the most frequented road in Blackpool, there is the large stagnant ditch receiving the sewage from the neighbouring houses, which has already been described at page 12; and more particularly in the vicinity of Lower Blackpool there are by the sides of the roads stagnant open ditches, containing sewage matter. Along the turnpike road, leading from Blackpool to Poulton, the sewage is in several places suffered to run into the road-side ditches, whilst the road through Great Layton is disfigured by the frequent occurrence of dung-heaps against the cottage walls, and is made offensive by the drainage from them, which runs in open channels along the road side.

The greater part of the surface of the roads in the township is

macadamized, and is kept in tolerable order; there is, however, much room for improvement, especially in the immediate neighbourhood of Blackpool.

The following return was furnished to me as being the total expenditure upon the repairs of the roads during the last three years:—

TOWNSHIP OF LAYTON-WITH-WARBRICK.

Expenditure in repairs and maintenance of roads						£.	s.	d.
in 1847	.	.	.	.	.	157	5	4
Ditto ditto, 1848	.	.	.	.	.	123	1	2
Ditto ditto, 1849	.	.	.	.	.	190	4	9

One of the most crying wants for the convenience of the visitors to Blackpool is that of lamps in the streets. At present the streets are left entirely dark, excepting where the stray light from a house-door or a shop-window throws its rays across the street. For some time back there has been a discussion about the propriety of establishing gas-works, both to light the streets and to supply private houses with gas, but hitherto nothing has been decided upon. The powers given to the Local Board by the Public Health Supplemental Act will doubtless induce them should the Act be applied to Blackpool, to decide the question and to take active steps towards laying down pipes, and contracting with some responsible parties for a supply of gas upon reasonable terms.

BURIAL GROUNDS.—Blackpool Church, with its graveyard, is upon the outskirts of the town, at some little distance from it. There are not at present any houses immediately adjoining to the churchyard, although, from the direction in which the land is laid out for building, it will probably, unless means are taken to prevent it, be surrounded by houses before many years elapse.

The first interment in this churchyard took place in October 1821, and there have been altogether up to the present time 263 interments in it. During the last ten years the burials were 150, and during the last three years they were 60; so that, as might be expected, the annual number is slightly increasing with the increased population of the place. As the churchyard is of tolerable size, having been enlarged a few years ago, it is ample for all the present requirements of Blackpool. I was informed that the graves were not dug deeper than 5 feet, and that there is no drainage from the churchyard. Some regulations will be necessary for future interments, both as to the depth of the graves and as to the space to be allotted to each of them; the ground should also be thoroughly drained, as it consists of a strong marl which does not allow of the escape of moisture, and consequently causes the process of decomposition to proceed but slowly. A new church has lately been built at a little distance from South Shore, and a churchyard has been formed around it; this will necessarily cause

diminution in the number of interments in the churchyard at Blackpool.

RECOMMENDATIONS AND REMEDIAL MEASURES.

It will be gathered from what I have said respecting the bad arrangements for the removal of refuse matter from many of the houses, both old and new, and the imperfect state both of the drainage and of the water supply in some places, and the total absence of them in others, that I am of opinion that the application of the Public Health Act would be beneficial to the health and comfort of the inhabitants of Blackpool and its neighbourhood. I therefore recommend that this Act be applied to such portion of the township of Layton-with-Warbrick as I have described below, and have marked upon the accompanying map, and that such district be called the Blackpool district.

I propose that the Blackpool district shall comprise the whole of that portion of the township of Layton-with-Warbrick which lies along the sea coast, and that it shall extend inland as far as the boundary of the said township, excepting that portion of it which lies to the east of Great and Little Layton, where I should propose to leave this boundary and to adopt the new boundary line laid down upon the map, so as to include the two villages of Great and Little Layton, but to exclude all that tract of land which extends from them towards the eastern boundary of the township. By adopting the above boundaries, the whole of the inhabited portion of the township would be included within the new district, together with the lands adjacent thereto, upon the proper drainage of which much of the salubrity of the neighbourhood depends, whilst the purely agricultural portion of Whinney Heys would be excluded.

SEWERAGE AND DRAINAGE.—In order to lay out an exact scheme for the proper and efficient drainage of Blackpool and its neighbourhood, and for the speedy removal from it of all refuse matter, it would be necessary to have an exact plan of the district, together with sections of the ground in various directions. In the absence of such data, I can only point out the general principles which I should propose to adopt, and such general lines of sewerage as will serve to illustrate the mode of carrying out those principles, and to guide the surveyor to the Local Board in the preparation of his plans.

In studying the directions of the outlets for the sewerage, it must be borne in mind, that the sewage is a valuable fertilizing matter, and should not, therefore, be wasted by turning it into the sea, or into the natural water-courses of the country; it should also be remembered that it is, when exposed to the atmospheric air, a fertile generator of disease, and consequently that it is indispensable to prevent any such exposure. By an examination of the relative

levels of the country around Blackpool, it will be seen that there is a large tract of land in the valley through which runs the Blackpool Stream, which lies at a considerably lower level than the town, and I have no doubt that the most judicious means of disposal of the sewage of Blackpool would be to distribute it over this land for agricultural purposes. There must, however, be a means of discharging the sewage into the sea, upon those occasions when it cannot be used upon the land, and I should propose to effect this by carrying an overflow pipe directly to the outlet of the Blackpool into the sea, unless it should be found upon examination that an outlet can be formed to the south of South Shore, as I shall have occasion to point out further on. This pipe should discharge itself below low-water mark, so that no annoyance could result from it in any state of the tide. A further advantage would be gained by carrying the outlet so far into the sea, namely, that of removing it from the influence of storms, which it is well known are felt more violently near the surface of the water than at a greater depth below it.

The level of the site of South Shore is much less advantageous for the disposal of its sewage than that of Blackpool; it appears, however, to be some low land towards the east of South Shore, where much of its sewage might be applied to agricultural purposes—that portion of the sewage which the relative levels will not admit of being disposed of in this manner, must necessarily be turned directly into the sea, as it would be quite out of the question to think of erecting any kind of machinery for the purpose of raising this sewage artificially to a higher level. The waste and overflow sewage from South Shore must then be carried in a pipe to the sea, and be delivered below low-water mark in the same manner as has been recommended for that from Blackpool.

A question arises, which can only be determined by the help of exact plans and sections, whether the overflow sewage from South Shore shall be discharged from the same outlet at the Blackpool, as that from the town of Blackpool, or whether one common outlet for them both might not be made, by carrying the overflow pipe along the lower land to the east of South Shore, and by discharging it into the sea *south* of that place. If this can be accomplished at a moderate expense, it would be much preferable to adopt this outlet, and thus to avoid altogether the discharging of the waste sewage into the sea near to human habitations.

I consider that, in order to derive the maximum of benefit from the application of the liquid sewage, the land over which it is distributed should be properly subsoil drained, a mode of proceeding which has been found to be most advantageous in the use of water for irrigation. The advantage of this deep drainage, as regards the sewage water, is twofold; in the first place, by the thorough filtration, which it has been found takes place during the soaking of the sewage through the ground to the deep subsoil drains, and

the fertilizing matter is abstracted by the soil for the use of the plants growing in it; and in the second place, the waste water, owing to this abstraction of the fertilizing matter which it must be remarked is also the offensive matter, runs off comparatively impid and clear, and may be turned into the natural water-courses of the country, without becoming a source of the least annoyance to the most delicate organs of smell, or of being in any way prejudicial to animal life. Neither of these objects can be attained by the surface-drainage of the land to which the liquid manure is applied, as in that case a small portion only of the fertilizing matter is abstracted, and the waste liquid retains much of its offensive character.

Having thus pointed out the general direction of the outlets and the mode of disposal of the sewage matter, I shall proceed to say a few words upon the house-drainage and the street sewers. The drains destined to receive the waste water from the sinks and water-closets, and the rainfall from the roofs and yards, may be of glazed earthenware pipes, 4 inches in diameter for the smaller houses, and 6 inches for the larger, whilst some of the large lodging-houses and hotels may possibly require drains of 7 or even 8 inches in diameter. In laying out these drains, advantage must be taken of all the fall which can be obtained between their upper end and the street sewer; there must be no abrupt bends or alterations of level in them; even the upright soil shafts should, wherever it is practicable, be curved at their junction with the drains, and the drains themselves must enter the street sewer with a gentle curve in the direction of the flow of the sewage. Care should be taken at the junctions of the different lengths of pipe that no part of the lower pipe projects within the line of the end of the upper pipe, so as to leave a shoulder against which solid matter can be accumulated. The street sewers in Blackpool and South Shore may, for the most part, be formed of pipes 9 inches in diameter, and it is by no means necessary, nor perhaps desirable, that they should all converge or deliver their sewage into one main sewer; on the contrary, I should propose that all the sewage north of Church-street should be collected into a 12-inch main sewer running eastwards and southwards, and delivering its sewage upon the low lands towards the south-east of that part of Blackpool. The remaining sewage of Blackpool may be collected into another 12-inch main to be laid down Bank Hey-street, so as to lead the sewage to the lands in the valley of the Blackpool. In laying out these lines of sewage, care should be taken to keep the discharging sewers as high as the levels of the houses to be drained by them will admit of, as by these means their outlets will allow of the distribution of the sewage over a wider extent of country, and thus a better market will be obtained for its sale. Of course the liquid sewage must not be used upon any lands so near the town as to allow of the least

inconvenience arising from its smell. Similar principles may guide the laying out of the lines of sewers in South Shore, but the difference of levels there is but small, it will probably be advisable to collect all the sewage into one main distributing sewer, and to carry it at once to the nearest land properly adapted for receiving it. From the distributing mains overflow-pipes may lead into the sea by the common outlet which I have described above.

I have mentioned glazed earthenware as being the material which the sewer and drain-pipes should be made; it is not, however, necessary that the pipes should be glazed, if they are made under sufficient pressure to ensure the interior of the pipes being perfectly smooth and uniform, so as to present no obstacle to the flow of the water within them.

In order that this plan of sewerage which I have endeavoured to sketch should be perfectly efficient, it will be necessary that a plentiful supply of water should be laid on to all the houses without which no system of sewerage will carry away the refuse matter, and recourse must be had to the old, inefficient, and expensive plan of making the sewers sufficiently large to allow their being cleaned out by hand.

With a good supply of water, all the privies which are at present so offensive may be converted into inodorous water-closets, and the stinking cesspools may be abolished; or where they are adapted for the purpose, they may be used for dust-bins. All communications with the sewers, whether through the street and yard gratings, or through the kitchens and other sinks, should be properly trapped, so that no offensive gases can come up through them.

WATER SUPPLY.—Considerable difficulty exists in obtaining a supply of soft water for Blackpool. The water from Marton Mere, which has been spoken of as capable of affording a supply, is far too hard for such a purpose; it is also so overgrown with weeds all around the banks where the water is very shallow, that a large amount of decomposing vegetable matter must mix with the water, and probably contaminates it to some extent. Mr. John Paton, to whose intelligent remarks upon the means of improving the sanitary condition of Blackpool I have previously alluded, states that from an analysis which he obtained of the water of this mere, he found the degree of hardness to be $29\frac{1}{2}$. This is probably a mistake, as when I analyzed the water, it took $28\frac{1}{2}$ test measures to form a proper lather with soap which corresponds to 14 degrees of hardness; I conclude, therefore, that Mr. Paton must have made a mistake between degrees of hardness and test measures, and that the $29\frac{1}{2}$ degrees to which he alludes were test measures, corresponding really to $14\frac{1}{2}$ degrees of hardness, which is sufficiently near to the result to which

same, considering the different seasons at which the waters were examined. I found a considerable amount of magnesia in this water, the principal ingredients besides the magnesia being lime and common salt. The hardness of this water, independent of other considerations, makes it quite unfit for domestic purposes.

Finding that there was no natural source to which recourse could be had for a supply of water, I looked about to see what collecting grounds could be found in the neighbourhood, and I observed that at Warbrick there is a tract of land containing about 178 acres, the lowest part of which is some little height above the site of the highest houses in Blackpool, and therefore considerably above that of the greater part of the houses both in that place and in South Shore. Although the elevation of this land is not so great as might be wished for in a collecting ground, it appears to me that it would be better to have recourse to the natural fall of the water from it, rather than to resort to the more expensive system of raising the water by the help of machinery, especially as the fall of the water collected from this ground would be ample to supply the highest stories of so large a proportion of the houses. Possibly it might be found advisable, when accurate levels have been taken as a guide in laying out the works, to divide this collecting ground into two portions, and to appropriate the higher portion of it with a separate reservoir, for the supply of the higher houses in Blackpool; collecting the water from the lower portion of it to serve the remainder of Blackpool together with South Shore; by this means all the houses might have a supply capable of delivering the water at the bed-room floors—a very important object to obtain, especially where, as at Blackpool and South Shore, there are so many large hotels and lodging-houses, in which places the labour of carrying the water up to the bedroom floors is very considerable.

With regard to the amount of water necessary for the supply of Blackpool, if the number of inhabitants during the summer season be calculated at 10,000, living in 421 houses, I should say that 63,000 gallons per diem, giving an average daily supply of about 150 gallons per house, would be ample for all purposes. To people accustomed to the old calculation of 20 gallons for the daily supply of each person, this quantity may appear to be very small, but when gauged by the more accurate results obtained from the actual measurement of the water consumed, made under the directions of the Board, and given in their Report upon the supply of Water to the Metropolis, I believe that it will be found to be ample, regard being had to the peculiar circumstances and character of the summer population of Blackpool.

I should recommend that arrangements be made for the deep subsoil drainage of the collecting grounds—say to a minimum depth of 4 feet—and that the water from the drains be led into two reservoirs to be formed at different levels, whence the water could be conducted in cast-iron pipes to the town for distribution.

The advantage of this deep drainage would be, that in passing through the marly subsoil the water would give off the purities which it imbibes from its first contact with the surface of the ground, and that consequently very little, if any, further purification would be required.

There would be no difficulty in forming these reservoirs, as the retentive character of the marl, no puddling would be required. The reservoirs should be deep, and be kept perfectly clean; they would require to be capable of holding at least three months' supply, so as to ensure an ample supply of water in the driest seasons. If the land from which the rain-water is to be collected be properly subsoil drained, I anticipate that the quantity evaporated would be found to be very much less than when the land has only surface drains, and that consequently a large portion of the rain-fall upon such land would be available for water supply; but if we assume only the ordinary calculation that about one-third in depth of the rain-fall will be saved in the course of the year, the collecting ground at Warbrick would afford, if the annual rain-fall be taken at 30 inches, a supply of 40,000,000 gallons annually, or nearly double the quantity actually required for Blackpool and South Shore.

Besides this collecting ground at Warbrick, another of about 70 acres is to be found at the Hill to the north of Blackpool, and there is a smaller piece of about 37 acres between the railway station and Great Layton, both of which would be sufficiently large to afford a supply by gravity alone to the lower part of Blackpool and to South Shore; so that this mode of obtaining a supply might be extended to meet the increased requirements of the place at a future time.

From the upper reservoir a 4-inch main may be laid down to convey the water to the higher houses, but a 6-inch main will be required from the lower reservoir for the supply of Lower Blackpool and South Shore. The distributing mains in the streets may be of 2 and 3 inch diameter, and the service-pipes for the house supply from $\frac{1}{4}$ to $\frac{3}{8}$, according to the quantities of water required. The supply must be a constant one, and the water be left on in the pipes at all times, so as to be ready both for domestic purposes and for use in case of a fire. As from the height of the reservoir the water will have considerable force, hose may be screwed on to the water-pipes, so as to obtain a supply for cleansing the exterior of the windows, in the same manner that I saw practised with a hand syringe whilst I was at Blackpool. The surface of the streets and pavements might also be cleansed by hose and jet, and the streets and promenades be watered during the summer time, which would be a great increase to the comfort of visitors, as, independent of the laying of the dust, a delicious freshness would be produced in the air in the hot weather by the evaporation of the water from the surface of the ground. If the public promena-

erlooking the sea were to be watered two or three times a-day in the course of the hot summer days, it would be found to be a great increase to its attractions.

BURIAL-GROUNDS.—Although the churchyards are not at present prejudicial to the health of the inhabitants, and do not appear likely to become so for many years, it would be well worth the while of the inhabitants of Blackpool, depending as they do for their prosperity not only upon the actual salubrity of their town, but also upon its fancied advantages in this respect, to take into consideration the propriety of forming a small cemetery at a distance from the town, and discontinuing the practice of interring the dead in the vicinity of the living.

It has been wisely observed in the preface to Mr. Paton's paper upon the Sanitary Condition of Blackpool, that—

“Sea-bathing places, whose sole existence is owing to the salubrity of their situations, must preserve their character in this respect, or they might as well be deserted, and left, as they were some century ago, to the sole occupancy of fishermen and seagulls.”

And again,—

“The salubrity of Blackpool is its stock in trade, and without the reservation of this indispensable characteristic, as well might its hotels be closed, and its lodging-houses be abandoned.”

It behoves, then, the inhabitants of such a place, not only to remove all that which can really interfere with the public health, but also to put away everything which the fastidious mind of a visitor, in search of renovation of health and spirits, might possibly conceive to be a drawback to his obtaining this object.

The tide of public opinion has set strongly against our barbarous practice, unknown to any extent amongst continental nations, of intramural interment; and I strongly recommend the inhabitants of Blackpool and South Shore not to allow themselves to be left behind in a matter which, if not attended to, will surely sooner or later prove highly detrimental to their interests.

ESTIMATES OF IMPROVEMENTS.—Owing to the absence of sufficient data, I have found it impossible to make a precise calculation of the cost of the improvements which I have recommended in the sewerage and water supply; I have, however, drawn up the following estimates which must be taken as approximations only, of the cost of them :—

ESTIMATE OF SEWERAGE.

	Yards.	Per Yard.	Cost.	Total.
		s. d.	£. s. £.	£. s.
Pipes of glazed stoneware—				
6-inch diameter	4,000	4 0	1,000 0 0	
9-inch ditto	3,000	5 6	825 0 0	
12-inch ditto	4,500	6 0	1,350 0 0	
				3,175 0
Street-gratings, outlet to sea, &c.			..	200 0
				3,375 0
Add 10 per cent. for contingencies			..	337 10
Total			..	3,712 10

ESTIMATE OF WATER SUPPLY.

	Yards.	Per Yard.	Cost.	Total.
		s. d.	£. s. d.	£. s.
Cast iron water-pipes—				
6-inch diameter	2,400	7 0	840 0 0	
4-inch ditto	5,000	5 0	1,250 0 0	
3-inch ditto	3,000	4 0	600 0 0	
2-inch ditto	3,500	2 3	393 15 0	
				3,083 15
Screw-cocks and fire-plugs			180 0 0	
Collecting reservoirs, with sluices and filtering culverts			900 0 0	
Drains for collecting water, compensation for land, fencing, &c.			400 0 0	
				1,480 0
				4,563 15
Add 10 per cent. for contingencies			..	456 7
Total			..	5,020 2

From these estimates it will be seen that a sum of about 3,700*l.* will be required for carrying out an efficient system of sewerage throughout Blackpool and South Shore, and that a further sum about 5,000*l.* will be needed for procuring a supply of water for these places, making a total of about 8,700*l.*, which sum, borrowed in accordance with the provisions of the Public Health Act, would require an average weekly payment of 2½*d.* for the sewerage, and 3¼*d.* for the water supply, for each of the 40,000 houses in the town, in order to pay the interest and liquidate the principal of this sum in a period of 30 years, after which time no further payments would be required beyond the charge for the annual maintenance of the works.

Lest any misapprehension should arise upon this point, I may here state, that the payment of the sewer and water-rates would be made for those houses or lands only which derived benefit from

these works, and that they would not be levied from the whole district. In order to meet such cases, the Act gives the Local Board power to subdivide the district and to levy special district rates for these objects.

Besides the general expenses of the sewerage and the water supply, there will be a further sum to be expended for each house in laying down the private drains from it, in bringing the water supply into the house, and in converting any privy which may belong to it into a water-closet, by fixing in it a syphon, or other trapped basin, and laying on a supply of water. The average expenditure per house for these objects may be estimated at about £. 10*s.*; which sum may also be borrowed when necessary, the principal and interest being paid off in 20 years, by a weekly instalment of 1*d.*

Thus for the important purposes of thorough drainage and water supply, the total average weekly charge per house would be 6*s.* 3*d.*; a sum which, although heavy compared to the cost of the same things in many other places, is so moderate, considering the size, and number of inhabitants of the houses, that I feel sure that no householder at Blackpool would grudge to pay it, in order to attain an object which will so certainly benefit him, by making a residence in his house so very much more convenient to visitors, and by removing from the public streets and promenades the open drains which at present disgrace so many of them.

I have said nothing respecting the profit to the town which may fairly be anticipated to arise from the disposal of the sewage matter for agricultural purposes. The large increase in the value of land where sewage water is obtainable by gravity, without the necessity of cartage, is well known, and I have no doubt but that eventually there will be much competition for so valuable a manure, and that the sale of it will go far towards paying the sewer-rates.

SUMMARY OF THE CONCLUSIONS ARRIVED AT IN THE PRECEDING REPORT:—

1. That the town of Blackpool and South Shore is destitute of any useful sewerage, the existing drains being insufficient for their object, and their outlets upon the sea-beach being a source of much injury to the houses in their neighbourhood.
2. That the arrangements for the disposal of refuse matter are very bad, both in the old and the new houses.
3. That although some few of the houses have a tolerable supply of hard and soft water, the majority of them are by no means well supplied, whilst some of the new houses are entirely destitute of them.
4. That the above deficiencies are not only very inconvenient to the inhabitants, but that in many cases they inflict pecuniary injury upon them by driving visitors away from their town.

SUMMARY OF THE RECOMMENDATIONS:—

1. That the Public Health Act be applied to the district Blackpool and South Shore.
2. That an efficient system of sewerage be laid down for the removal of all refuse matter, and that the same be applied to agricultural purposes.
3. That all cesspools be abolished and filled up; that all the privies be converted into water-closets; and that proper receptacles be provided for ashes and other solid refuse.
4. That rain-water be collected in reservoirs from deep drained collecting grounds, and that cast-iron main and branch pipes be laid down to distribute this water for domestic purpose.
5. That a cemetery be established for the use of the inhabitants as a burial-ground, and that the existing churchyards be no longer used for this purpose.

I have the honour to be,

My Lords and Gentlemen,

Your obedient Servant,

B. HERSCHEL BABBAGE.

To the General Board of Health,

&c.

&c.

&c.